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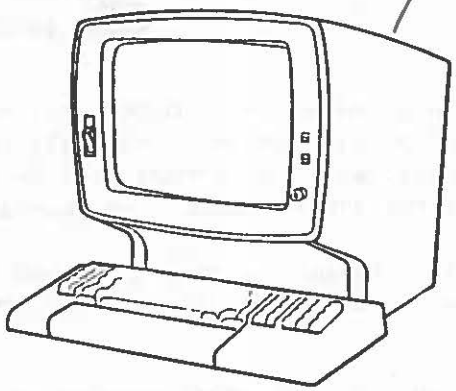
Computer Center News Letter / November 30, 1981

Monterey, California, Naval Postgraduate School

Computer Center News Letter



NAVAL POSTGRADUATE SCHOOL
MONTEREY, CALIFORNIA

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SYSTEM DOWN FROM 21 DECEMBER TO 4 JANUARY

We expect the IBM 3033 system to be down for two weeks during the Christmas break, while Public Works and the contractor make the switchover to the permanent power and cooling systems. (You may recall that the 3033 was installed last Christmas only after heroic efforts by Public Works and our staff to create temporary power and cooling facilities.) The planned shutdown schedule is:

DATE	REASON
0800 5 Dec-Saturday	No power in Ingersoll while electrical substation in In-136 is connected.
0800 20 Dec-Sunday to 0800 4 Jan-Monday	Completion of the connection of the UPS (Uninterruptible Power System) and additional air conditioning and cooling capacity.

In parallel with this work, we will be doing some re-arrangement of the computer room to accomodate new disk drives and change some channel configurations. The system will be restored to full service as soon as possible after 20 December. However we are warning users that it may take until 4 January.

Any changes in this proposed schedule will be posted in the Center and announced in the log message on the time-sharing system.

IBM 2741 TERMINAL SUPPORT TO BE REDUCED

The Center is planning to remove almost all of the public IBM 2741s and curtail support of private 2741s. The remote IBM 2741s compete for 8 lines at 134.5 bps on the IBM 2702. We propose to remove the IBM 2702 and provide IBM 2741 support (4 lines) on the IBM 3705 communications controller which will then handle almost all of the telecommunications on the IBM 3033 system.

If any users anticipate problems with this proposal please contact:

Clarence Kellogg, Manager, Computer Operations (In-109, X2004).

ON-LINE NEWS AT NPS

Do you want to find out the latest Computer Center News? The next time you log on, try typing

NEWS

You will be able to read at your terminal a variety of news items contributed by the Center's staff. If you prefer, you can have the news file copied to your disk or printed on the system printer with the commands

NEWS DISK

or

NEWS PRINTER

respectively. For a complete description of the NEWS command and its options, type

NEWS ?

Another command, OLDNEWS, can be used to access old news stories archived by month and category. (Stories more than two weeks old will not be accessible with the NEWS command). Like NEWS, OLDNEWS can be directed to send output to your terminal (the default), your A-disk, or the printer. Type

OLDNEWS ?

to find out how to use the OLDNEWS command.

Please direct questions or comments on any aspect of the News Facility to Joanne Bogart, In-105, X2651.

NOTES FROM OPERATIONS

Mass Storage Volumes MS0001, MS0002 and MS0026 to be Withdrawn

In February, 1981, shortly after the installation of the IBM 3033, we introduced these three mass storage volumes to hold all data sets that previously resided on volumes DISK01, DISK02, MARY, LINDA, and DUFFY on the IBM 360/67. They were to be available for a period of 6 months to enable users to change to other means of storage. Users must now move any data sets that are still required to public or private mass storage volumes. See Sections 7.2.4.3 and 7.2.5.6 of Technical Note MVS-01, Users' Guide to MVS at NPS. For further assistance, see the Programming Consultant, In-146.

Cabling for Remote IBM 3278s

Public Works Department has begun the stringing of coaxial cable connections to the public workstations and private offices. The public clusters will be brought on-line as the cabling is completed in each building. The terminals will be moved from Ingersoll Hall as required.

Maximum Number of MVS Jobs

All users of the MVS batch processing system should be aware that a maximum of five concurrent jobs per user is allowed. It is vital that all users be able to get their fair share of available resources and excessive "shotgunning" can cause real problems for others. Please observe this limit. Your job(s) may be cancelled if you don't.

Tape Users ....Help!

Since the installation of JES3, operations has experienced an unusual difficulty when it comes to mounting user tapes. If your JCL reference to a tape specifies DISP=(OLD) for the data set, the system will not use the tape if there is a read/write ring in place. It forces an unload of the tape and a subsequent remounting of the tape after the operator pulls the ring. Under normal circumstances this provides an excellent safety check for the user. In this instance, however, it puts the decision about pulling rings and installing rings on the operator and not on the user where it logically belongs in our environment. If you want to control the ring status within your job execution, you must code the following main card as the second control statement in your deck.

```
//*MAIN RINGCHK=NO
```

Operations will not be responsible for inserting or pulling write rings in tapes unless a written request is submitted prior to job execution. Such requests can be made using the service request form available at the output distribution counter (In-140).

STAFF CHANGES

Ms. Betty Curry, who has been the Administrative Assistant to the Director for several years, recently retired. Users of SCRIPT will miss her help sorely, as will all members of the Center's staff who relied on her excellent work. Ms. Jeriellen Finch, who has been a clerk-typist in the administrative office will become Administrative Assistant. We know she will also do an excellent job.

Ms. Romana Schmidt has been appointed as clerk-typist. Additionally, she will be in charge of the Center's library in In-162. We welcome her to the Center's staff.

HARWELL SUBROUTINE LIBRARY IS AVAILABLE

Source programs from the Harwell Subroutine Library can now be obtained for use on both the MVS batch and CMS timesharing systems. These routines are generally accepted as high-quality software and contain some facilities not available in the IMSL repertoire. Writeups of all Harwell routines are available for reference purposes in labelled orange binders kept in the Computer Center Library, In-162. Users may copy a limited number of writeups in In-130. On-line documentation is not provided with the Harwell Library, which is supported by the United Kingdom Atomic Energy Authority.

A copy of "Harwell Subroutine Library - A Catalog of Subroutines (1980)" has been placed at the beginning of the first volume of the writeups. Another copy (green cover) is available for reference purposes in the Consultation Office, In-146. Whenever you run a job to obtain routines from the Harwell Library you should carefully check the "calls" section of the writeups or catalog description in order to call out all auxiliary routines in the Harwell Library which may be invoked by the routine of primary interest.

In each location you can also find a copy of a Technical Memorandum, Use of the Harwell Library at NPS, which describes how individual source modules can be obtained.

MINITAB SAMPLE DATA

Sample data sets are available for MINITAB, the interactive statistical package distributed by Pennsylvania State University. (Installation of this software was announced in the last issue of the Newsletter.) These data sets are used as examples and exercises in the "MINITAB Student Handbook" by Ryan, Joiner, and Ryan, Duxbury Press, 1976. Included are the extended examples from Appendix A: Cartoon, Peru, Trees, Grades (Samples A,B,C,D), Pulse, Integration, Cancer (Groups A,B,C,D).

Before you can read one of these data sets into your Minitab workspace, the data set must be placed on your A-disk. To copy a data set to A-disk, follow this example which is for the data set, CARTOON.

```
minitab cartoon
```

Some of the names had to be changed to fit the conventions of a CMS filename. For more information on the data sets available and their exact names, issue

```
minitab bookdata
```

THESIS1 AND THESIS2 PRINT FORTRAN PROGRAMS

The Center's subroutine library contains two rather antique programs, THESIS1 and THESIS2, which were designed to print the source version of a Fortran program.

Formatting is performed so that the output is suitable for inclusion as an appendix of a NPS Thesis. These programs do not format the text of a thesis document. The most useful software we have for that purpose is SCRIPT. However, we have not yet created the macros that would be required to make SCRIPT easy to use, that is, make it conform to local thesis format requirements. Therefore, such users of SCRIPT must become familiar with the NPS thesis rules and be sure their text is in conformance.

USING MSS DATASETS

Some users are having trouble maintaining current catalog entries from MSS datasets on MVS. Part of the problem is that a dataset cannot be cataloged if its name exists in the catalog already, or if the name is contained in another cataloged dataset name. Another part of the problem is that the method of using utility IEFBR14 to scratch and uncatalog is reliable only if the MSS group name is included in the DD card. Otherwise, a dataset is sometimes scratched, but not uncataloged. To ensure that the dataset is both scratched and uncataloged, use the following sort of job control statements:

```
// EXEC  PGM=IEFBR14
//DD1     DD  DISP=(OLD,DELETE),MSVGP=PUB4A,DSN=MSS.XNNNN.ANYNAME
/*
```

If you wish to see which of your datasets have been cataloged, a list may be obtained by using the following access method services utility:

```
// EXEC  PGM=IDCAMS
//SYSPRINT DD  SYSOUT=A
//SYSIN     DD  *
  LISTCAT LEVEL(MSS.XNNNN)
/*
```

(Where XNNNN is your user identification.)

To uncatalog a dataset that somehow has been deleted, the following utility may be used:

```
//  EXEC    PGM=IEHPROGM
//SYSPRINT DD  SYSOUT=A
//DD1      DD  UNIT=3350,DISP=SHR,VOL=SER=MVS001
//SYSIN    DD  *
  UNCATLG  DSNAME=MSS.XNNNN.ANYNAME
/*
```

(Here we assume the dataset is known to exist on MVS001.)

FORTRAN GLITCH WHEN WRITING PARTITIONED DATA SETS

Some users have attempted to create members of partitioned data sets on MVS by writing Fortran output. Unfortunately, when an END FILE is issued, the end of file is written on the next track, but the format 5 DSCB is not updated. When a subsequent member is added, it begins on the track where the previous member's end-of-file was written, so the previous member has no end-of-file. The solution to this problem is always to perform a REWIND after the member is written, rather than an END FILE.

XEDIT NOTES

Have you found a new file listed in your directory with the following file identification?

XEDTEMP CMSUT1 A1

When such a file exists, you find yourself unable to use XEDIT. One way this phantom file can be generated is when the system goes down while you are editing. The most often asked question is how one can recover the work done in that interrupted editing session.

XEDIT uses temporary files, one of which is XEDTEMP CMSUT1. As long as this file exists, you cannot get into XEDIT. However, you don't want to erase this file immediately because it is the file you were working on when the interruption occurred. To see if this file is the one you want to keep, issue

TYPE XEDTEMP CMSUT1

You can page through the file quickly by using the ALT and CLEAR keys. If you decide to keep this file rename it, otherwise erase it.

Example:

```
TYPE XEDTEMP CMSUT1
=
=
=
R;
RENAME XEDTEMP CMSUT1 A1 NEWFN NEWFT =
R;
```

After the temporary file has been renamed, the XEDIT command can be invoked successfully.

MORE ON QUADRUPLE-PRECISION DIVISION

(In the last issue of the Newsletter we discussed why this operation is disportionately slow. The following additional information from an article by J. Ehrman is taken from an issue of the SLAC Computing Service Bulletin.)

Quadruple precision division is implemented as follows: first, the compiler generates an invalid machine instruction (a "DXR" opcode); when executed, the DXR "instruction" causes a hardware interrupt for an invalid operation code. The system interrupt-handling software analyzes this interrupt and determines that it is the special case of DXR; the DXR supervisor routine is then called to do the software division via software. Because there are more instructions executed for handling the interrupt than for implementing the QP divide, DXR can be disportionately expensive in CPU time. For example, on an IBM 3033 a loop of 100,000 QP divisions generated by FORTRAN HX (with DXR instructions) requires about 14 seconds of CPU time to execute.

The following FORTRAN HX FUNCTION subprogram does a software QP divide without going through the interrupt supervisor, and will yield results which differ from DXR results by no more than the eight low-order bits.

```
      REAL FUNCTION QDIV*16(X,Y)
C==========QP DIVIDE  RESULT=X/Y
C           THIS USES A NEWTON RAPHSON APPROXIMATION FOR
C           1/Y.  SEE CACM 4(1961):98.
C           AGREEMENT IS WITHIN 8 LOW-ORDER BITS OF DXR MACRO
C           (ACCURATE TO APPROXIMATELY 30 DECIMAL DIGITS).
      REAL*16 X,Y
      DOUBLE PRECISION QPTODP
      QPTODP(Y)=Y
      QDIV=1.D0/QPTODP(Y)
      QDIV=X*QDIV*(2.Q0-Y*QDIV)
      RETURN
      END
```

The CPU time on an IBM 3033 for a loop of 100,000 FORTRAN HX calls to QDIV(X,Y) is about 2.3 seconds, or 6 times faster than doing QP X/Y. If the QDIV code is implemented in-line with the following two arithmetic statement functions:

```
      REAL*16 X,Y
      DOUBLE PRECISION QPTODP
      QPTODP(Y)=Y
      QDIV(X,Y)=X*(1.D0/QPTODP(Y))*(2.Q0)-Y*(1.D0/QPTODP(Y)))
```

then the CPU time goes down about 1.7 seconds or about 8 times faster than doing QP X/Y.

If IBM ever decides to implement a machine instruction to perform QP division, existing object programs could automatically benefit, provided that the (currently) invalid machine instruction matches the (possible) future machine instruction. In the meantine, the CPU time utilized by Fortran programs that rely heavily on QP divides can be significantly improved by using one of these QDIV functions to avoid the DXR generated interrupt.

FIXING THE SYSTEMS PROGRAMS

(The following excerpt concluded an article in the September-October, 1980 issue of UCLA's Perspective, newsletter of the Office of Academic Computing. The article concerned an error in the FORTRAN G1 compiler, an error which was subsequently fixed. All who program are aware of what it takes to debug a program; consider what it is like to fix the system's programs.)

Sometimes there can be problems associated with fixing a problem. The following is a verbatim extract from one of IBM's reports on this problem. A close reading is necessary, but it does make sense. A few definitions of IBM jargon can make it more readable:

> PPnnnnn is an APAR (Authorized Problem Action Request) number. APAR's are IBM's mechanism for reporting and responding to software problems.
>
> PTF's are Program Temporary Fixes, commonly in the form of program ZAP's.
>
> A ZAP is a program change applied by an IBM utility program. ZAP's are distributed as hexadecimal changes at absolute addresses in particular program modules and control sections.

THREE ZAPS ARE ASSOCIATED WITH THE APAR.
THE FIRST ZAP BYPASSES AN INCORRECT FIX FOR PP38149 CONTAINED IN PTF C2001.
THE SECOND ZAP RESTORES THE CODE AS IN FIT C2001 IF THE ZAP FOR PP60340 WAS APPLIED. THE ZAP FOR PP60340 WAS AN INCORRECT EXTENSION OF THE FIX FOR PP38149.
THE THIRD ZAP CORRECTS THE ORIGINAL PROBLEM AS EXPRESSED IN PP38149. THE THIRD ZAP SUPERCEDES THE FIRST ZAP, AND THE SECOND ZAP IS ONLY NEEDED IF THE ZAP FOR PP60340 WAS APPLIED.

And you thought systems programmers had an easy life.

RECENT ADDITIONS TO THE COMPUTER CENTER LIBRARY

Books

Author	Title
Smith, Ronald B.	How to Plan, Design & Implement a Bad System
Foster, Caxton C.	Real Time Programming
Hennell, M. A. et al	Production and Assessment of Numerical Software
Herman, Gabor T.	Image Reconstruction From Projections
Knuth, Donald E.	Tex and Metafont
Aho, Alfred V. et al	The Design and Analysis of Computer Algorithms
Lehnert, Wendy G.	The Process of Question Answering
Bjorck, Ake	Large Scale Matrix Problems
Mosteller, William S.	Systems Programmer's Problem Solver
Pyster, Arthur B.	Compiler Design and Construction
George, Alan et al	Computer Solution of Large Sparse Positive Definite Systems
Cody, William J. Jr. et al	Software Manual for the Elementary Functions
Baase, Sara	Computer Algorithms
Jacoby, Samuel L.S. et al	Mathematical Modeling With Computers
Manna, Zohar	Lectures on the Logic of Computer Programming
Cortada, James W.	EDP Costs and Charges
Mead, Carver et al	Introduction to VLSI Systems
Beckman, F. S.	Mathematical Foundations of Programming
Rubin, Martin L.	Documentation Standards and Procedures for Online Systems

Proceedings

Author	Title
Share, Inc.	Proceedings of Share 56-Houston, 1981
Share, Inc.	Proceedings of Share 57-Chicago, 1981
AFIPS	Proceedings of AFIPS Conference Vol. 49
LISP	Proceedings of LISP 1980

The Newsletter is appears semi-quarterly and is written by members of the staff, W. R. Church Computer Center (Code 0141), Naval Postgraduate School, Monterey, California 93940. Requests for further information or suggestions for articles for the Newsletter may be addressed to the User Services Manager, Code 0141 (In-133), ext. 2752 (or ext. 2573 for messages).

The Center provides batch-processing service under OS/VS2 MVS with JES3 and timesharing service under IBM VM/SP CMS. These services are based on an IBM 3033 Attached Processor System with 16 megabytes of storage.

DISTRIBUTION

List 3, plus 1-A5, 300-B2, 3-B3, 1-B13, 3-F3, 1-F4, 1-F5, 1-F6, 1-Code 49, 60-Student Mail Center (Lobby)